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PROBLEMS FOR SOLUTION.

ALGEBRA.

318. Proposed by PROFESSOR R. D. CARMICHAEL, Anniston, Ala.

Sum to infinity the series $n/(4n^2-1)^2$ beginning with $n=1$.

319. Proposed by C. N. SCHMALL, New York City.

A man desires to purchase eggs at 5 cents, 1 cent, and $\frac{1}{2}$ cent, respectively, in such numbers that he will obtain 100 eggs for a dollar. How many solutions in rational integers?

320. Proposed by FRANCIS RUST, C. E., Pittsburg, Pa.

Solve for t, $\cos t = m\cos 2t$.

GEOMETRY.

345. Proposed by LLOYD HOLSINGER, Bradley Polytechnic Institute, Peoria, Ill.

If a variable polygon move in such a way that its n sides turn severally round n fixed points O_1, O_2, ..., O_n while $n-1$ of its vertices slide, respectively, along $n-1$ fixed straight lines v_1, v_2, ..., v_{n-1}, then the last vertex will describe a conic; and the locus of the point of intersection of any pair of non-adjacent sides will also be a conic. Cremona's *Projective Geometry*.

346. Proposed by G. I. HOPKINS, M. A., Professor of Mathematics and Astronomy, High School, Manchester, N. H.

Prove the theorem for finding the lateral area of a frustum of a cone without the use of the theory of limits.

347. Proposed by W. J. GREENSTREET, M. A., Marling School, Stroud, England.

ABC is a triangle, and D, E, F are the mid points of the arcs of its nine-point circle cut off by BC, CA, AB, respectively. The inscribed circle touches these sides at X, Y, Z. Are the lines DX, EY, FZ concurrent? A purely geometrical discussion required.

CALCULUS.

276. Proposed by G. B. M. ZERR, A. M., Ph. D., Philadelphia, Pa.

In a certain country the tax per \$1 on a person's income varies as the cube root of the number of dollars, and when the income is \$8000 the rate per dollar is 5 cents. Find the largest net income possible.

277. Proposed by W. J. GREENSTREET, M. A., Marling School, Stroud, England.

Find $\frac{d^2x}{ds^2}$ and $\frac{d^2y}{ds^2}$ for $y=c\sinh\frac{x}{c}$.

278. Proposed by S. A. COREY, Hiteman, Iowa.

If C be Euler's constant, .577,215,664,9... and if B_1, B_2, B_3, etc., be Bernoulli's numbers, $\frac{1}{6}$, $\frac{1}{30}$, $\frac{1}{42}$, etc., prove that

$$C=\tfrac{1}{2}+\frac{B_1}{2}-\frac{B_2}{4}+\frac{B_3}{6}-\frac{B_4}{8}+\ldots-(1)^m\frac{B_m}{2m}+\ldots.$$